NOTE.—I am very glad that my friend Professor Mercanton has called attention to the fact that the Swiss Expedition to Greenland made seven ascensions near the margin of the inland ice on Disco Bay. Quervain'shavn does not appear on maps of Greenland since it was named after the eminent Swiss savant whose lamented death has just been announced. It is largely for this reason that I had not observed the fact of these ascensions near the ice cap.—*Wm. H. Hobbs.*

A NEW THERMOMETER SCALE

Another attempt to improve upon the thermometer scales in current use has come to our notice. Dr. F. E. Aspinwall of Miami, Fla., has devised the "Homigrade scale," in which the 0° is the same as the 0° Centigrade, while 100° corresponds to the normal temperature of the human body, 98.6° F. Doctor Aspinwall points out that his 0° is a "vital heat zero," because it marks the temperature at which vital action of organisms ceases or becomes dormant.

The ratio of the homigrade degree to the Fahrenheit is as 1.5 to 1, hence conversion is a simple matter.

The proposed scale renders the use of fractions in recording temperatures still less necessary than with the Fahrenheit scale. The 0° and the 100° are at critical points which, though familiar, do not both refer to changes of state of water. This is a serious fault, and undeniably attractive in some respects as Doctor Aspinwall's proposal is, the fault will doubtless severely restrict acceptance of the new scale.

A complete discussion of the homigrade scale may be found in the Medical Journal and Record, for November 3, 1926.—*B. M. V.*

AN UNUSUAL WELL [1]

On the mesa of Juniper Flat, Oreg., there is a well having unusual characteristics. In addition to furnishing a plentiful supply of very good water, it also serves as the barometer of its proud owner, Joe Riggles, and his neighbors.

Twelve to twenty-four hours before a storm arrives a gentle draft begins to come out of the well, the intensity increasing rapidly to almost a roar. Throughout the duration of a storm the well continues to "blow," sometimes so violently as to emit a cloud of water vapor. Within 12 to 24 hours after the storm has passed the well will cease blowing and begin to inhale and air will continue to flow into it until equilibrium is reached or a new period of exhalation begins.

The well is 458 feet deep, drilled through a blanket of basalt overlying the older formation. In the drilling numerous crevices and cavities were encountered in basalt formation. The local theory of the well's behavior is that it taps some long subterranean chamber having an outlet somewhere in the mountains miles away. Such an explanation is open to considerable doubt. More likely the well merely taps a number of local crevices or chambers containing air of approximately constant temperature and pressure. This air flows in or out of the well as the surface pressure is greater or lower than the subterranean pressure. The relatively long periods over which the well is in activity may be accounted for by the throttling effect of the small orifice through which the air has to pass. Some idea of the pressure at which the well begins to exhale may be had from the following table. The pressures were interpolated from the isobars of the A. M. weather map.

January 22—30.60, well quiet.
24—30.30, well quiet
25—30.25, well quiet.
26—30.05, well began blowing about noon.
27—29.75, well blowing violently.
28—no further data.

It is probable that some interesting information might be gained from an air current meter and barograph if installed at the well.—*A. G. Simson*, Forest Service.

[1] The relation between air pressure and breathing wells has been known for some time. See this Rev. 28:293, 43:562, 44:75, 46:26,1141.—*A. J. H.*

TORNADOES STARTED BY AN OIL FIRE.

[Reprinted from Meteorological Magazine, January, 1927, pp. 292-294.]

The Scientific American for December, 1926, contains a vivid description of the effects of a fire which destroyed nearly 6,000,000 barrels of oil at San Luis Obispo, Calif. An account of the event was given by Mr. J. E. Hissong, of the local weather bureau of this California city. He states that the fire was started by lightning and that initially four tanks, each containing 750,000 barrels of oil, "boiled over." An immense quantity of burning oil was spread over an area which was estimated at about 900 acres, or nearly 4 square kilometers. Flames seemingly leaped up to a height of 1,000 feet, and at the same time violent whirlwinds formed over the fire. During the period when the large reservoirs were burning and the convection was probably at its strongest, the whirls were numerous and violent. Some hundreds of whirls were observed simultaneously, many of them presenting the features of true tornadoes, with gyrating funnel-shaped clouds, the condensation of vapor in the central portions showing up clearly against the dark background of smoke. It is reported that some of the central funnels were not more than about a foot in diameter.

One of the whirls traveling downwind to a cottage about a thousand yards away, picked up the cottage and carried it a distance of 150 feet, where it was dropped, a complete wreck, the two occupants being killed.

Mr. Hissong reports that strong southerly winds prevailed initially, shifting later to west, and eventually to northwest. He attributes the formation of the whirls to the veering of the wind, which coincided more or less with the information of the whirls. It is difficult to see how this in itself could account for the whirls, and the present writer suggests that the whirls were such as might have occurred, independently of any wind, by the convection currents removing large masses of air, which would be replaced by the convergence of air from all sides. The converging air by retaining its original moment of momentum, about the center of the rising column, would after convergence have acquired a large velocity of rotation about the center, and would give rise to whirls of the nature observed.

A rough estimate of the energy liberated by the fire can be readily made. A given weight of oil will raise the temperature of one thousand times its own weight of water through 10° C. The fire of 6,000,000 barrels, assuming a barrel to be half a cubic meter, is equivalent to the burning of 3.10^9 kilograms and would produce 3.10^{13} kilogram calories; taking the specific heat of air to be 1/4, we find that this would heat 12.10^{12} kilograms of air through 10° C. This amount of air is about 10^{13} centimeters, or 10^4 cubic kilometers.

If there were no wind initially, then if we assume that 10^4 cubic kilometers of air is removed through a funnel vertically over the fire, this amount of air must drift in sideways to the zone of the fire, and be replaced by air pushing in from further distances. Taking the zone of fire to be a circle of 1 kilometer radius, this involves the convergence to the edge of the zone of fire of air from 50 kilometers away. The angular momentum of this air remains constant, in space, and if the velocity in the whirl about the fire be v at the edge of the fire (at 1 kilometer from the center) we then have

$$(50)^2\,\omega \sin\phi = \text{I.}\,(v + \omega \sin\phi).$$

Thus v = approximately $(50)^2\,\omega \sin\phi$.
$= 2{,}500 \times 5.7\ 10^{-5}$ kilometers per second.
$= 142$ meters per second.

Thus the whirl formed in still air would have a whirling velocity of 142 meters per second at 1 kilometer from its center, with velocity decreasing outward in inverse proportion to distance from the center.

In the case in question, the air was not initially still, and so the ascending cylinder of air was replaced by a sheet of air, and the one whirl was replaced by a number of smaller whirls. Enough has been said, however, to show that the supply of energy available from the fire was ample to account for the formation of violent tornadoes without assuming any special properties of the wind distribution. Moreover, it has been assumed above that only air heated through 10° C. will ascend, whereas it is certain that in the region of such a fire as this air heated through a much smaller range of temperature would ascend readily. If we decrease the necessary range of temperature we increase the volume of air removed by convection in inverse proportion, and increase the intensity of the whirl in proportion to the mass of air removed.

It may be recalled that during the fires which completed the destruction of Tokyo after the earthquake of September 2, 1923, Doctor Fujiwhara reported the formation of a number of whirls.[1]—*D. Brunt.*

METEOROLOGICAL SUMMARY FOR SOUTHERN SOUTH AMERICA, DECEMBER, 1926, AND ANNUAL SUMMARY FOR 1926

By J. B. NAVARETTE, Director

[Observatorio del Salto, Santiago, Chile]

During December, atmospheric changes were largely limited to the southern part of the country, while the weather was more settled in the Central Zone.

On the 1st a depression crossed the far south, causing rain up to Arauco. Between the 2d and the 5th an anticyclonic center overlay the southern area, causing general fine weather. On the 6th began an important period of bad weather, which culminated on the 13th with a heavy rainstorm that extended as far north as the Province of Talca in the Central Zone. The maximum precipitation was recorded on the 12th at Valdivia, 63 millimeters.

From the 14th to 18th, pressure rose in the south, and general fine weather was the rule.

On the 19th and 20th a moderate depression lay off Punta Tumbes, and caused rains between Maule and Valdivia.

The 21st, anticyclonic conditions reestablished themselves in the south and dominated the situation until the end of the month, causing in the Central Zone general fine weather, southerly winds, and high temperature.

ANNUAL SUMMARY, 1926

The meteorological year 1926 was one of the rainiest of record in the Central Zone from 1873 to date. The period of most intense atmospheric circulation was included between May 20 and July 13. Between these dates occurred almost the entire year's rainfall. June was the rainiest month. Total precipitation for the year reached [an average in the Central Zone of] 824.1 millimeters.—*Transl. B. M. V.*

[1] Meteorological Magazine, December, 1923, p. 247.

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C. FITZHUGH TALMAN, in Charge of Library

RECENT ADDITIONS

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